

TO: DNCT and DEFT
FROM: Bruce Herbold, USEPA
RE: Flexible operations scenarios
DATE: September 28, 1998

This memo is intended to answer the DNCT request for descriptions of alternative scenarios for flexible protection and also responds to the DEFT request for a fuller description of the matrix approach to flexible operations that I outlined on September 17th. None of the following discussion should be taken as indicative of anyone's policy positions.

Flexible Regulations

Many people have suggested that the E/I ratio is inefficient and ineffective in controlling the effects of entrainment. The WQCP allows for more stringent and more lenient E/I ratios as long as the overall requirements are met, but this option has been seldom used. The following discussion could be implemented under the 1995 WQCP or it could be expanded to replace that portion of the plan. This discussion builds on my Sept 11 memo and the comments and responses I have received on it.

I assume the goals of flexible operations would be:

1. Reduce entrainment effects on young delta smelt in the April through June period
2. Reduce entrainment effects on adult delta smelt in the January through March Period
3. Reduce entrainment effects on salmon fry in the delta in the January through March period
4. Reduce entrainment effects on spring-run yearlings in the October through December period
5. Reduce entrainment effects on striped bass in the June through August period

Each of these goals varies in importance from year to year in response to fish behavior and hydrological triggers, such as:

1. Did smelt spawn within, or did the young move toward, the zone of influence of the pumps?
2. Did adult delta smelt move up the Sacramento or San Joaquin River? Generally more adults seem to move toward the pumps following a very dry year than following a wet year.
3. Are there fry in the delta? This generally happens only in years with early, very wet storms.
4. Did spring-run move out of the tributaries the previous spring or can we expect a lot of yearlings in the subsequent fall?
5. Outmigrating smolts from the San Joaquin River can occur from mid March through early January and are particularly sensitive to project operations outside of the April 15-May 15 period.
6. Did striped bass spawn in the San Joaquin and/or is the bulk of the striped bass index located in the delta rather than Suisun Bay?

For each species within each of their periods of sensitivity, there are two parameters that describe the possible protective action at the export pumps — magnitude of pumping reduction and duration of pumping reduction. From recent experience it seems likely that delta smelt would be best served by a severe reduction in pumping as soon as they are found within the zone of influence of the pumps but that a period of roughly 5-10 days is adequate to get them out of the zone under most hydrological conditions. San Joaquin salmon fry, on the other hand, require a

much longer period of protection but they occur only rarely and in years of very high water availability.

Thus, biology can give us a good description of the triggering conditions under which each species is sensitive to operations. Data from salvage operations can provide a general estimate of the duration of that sensitivity. The level of exports consistent with protecting each species is more difficult to determine. For some species it is likely that sensitivity is controlled by the absolute magnitude of diversions (such as young delta smelt in the south delta) whereas for others sensitivity is probably a function of other hydrodynamic conditions (such as outmigrating smolts in the Sacramento River).

The proposed method involves a matrix of intensity of export reduction vs duration of export reduction. One corner of the matrix would represent a long and intense export reduction that would likely provide a high level of assurance that entrainment problems would require no additional ESA actions. At the opposite corner of the matrix, brief and weak export reduction would give little basis for ESA assurances. In between, would be all possible scenarios for the reduction of entrainment. The combination chosen would need to be tied to the appropriate triggering condition. For example, delta smelt seem to move out of the zone of influence of the pumps rapidly in wet years and slowly in dry years so the number of days of pumping reduction should probably be a function of year type. Alternatively, the pumping reduction might be tied to smaller scales of hydrological pattern; for instance, when X2 is at Roe Island the salvage of delta smelt is generally much less than when X2 is near Collinsville so the appropriate number of days or the intensity of pumping restrictions might be much less.

For all species except young delta smelt in the south delta, there are probably several combinations of the degree of export reduction and its duration that provide equivalent environmental protection. The choice of a long period of low reduction or a short period of high reduction may have very different implications to water operations. Particle tracking modeling to better define the zone of influence for each species during its times of sensitivity might provide a tool to determine the necessary degree of pumping reductions to achieve protection.

In all cases, I assume that a quick response of reducing entrainment impacts in response to monitoring and environmental cues will provide much greater protection than can be addressed by waiting for fish to show up at the screens. This approach will require four steps:

1. Basing the new regulations on clear, testable relationships between environmental conditions and entrainment impacts. Updating these relationships as we gain experience.
2. An excellent monitoring program like the current spring-run and real-time monitoring programs
3. Adequate but limited periods of export reduction which the regulatory agencies can use to reduce entrainment so that there is the ability and incentive each year to become more effective.
4. Adequate background protection during times when export reductions are not used so that the species-specific nature of entrainment reduction does not threaten other species.

Environmental Water Account

This issue is similar to some of the writings last year by Dave Fullerton and myself regarding the accounting for 800 TAF under CVPIA b(2). This issue differs in that I expect a firm agreement of how water enters the account will be developed this time. This memo only addresses how the water might be used.

If environmental water is purchased or developed it will reside in a particular location and be subject to loss through flood control releases, displacement by senior rights-holders, evaporation, etc. Thus, the amount of water available in any year will fluctuate greatly. In addition, many of the tools being developed by the NoName Group will reduce the amount of free storage south of the delta (where it would do the most good). If environmental water can be treated like other contracts it might be more reliable in volume but with a reduced ability to ensure that it will be used where needed. However, if the point of delivery for environmental water is Chipps Island, the entity charged with managing the Environmental Water Account would be in a position to sell its water to other water users. Waterusers could then make offers to purchase that water in exchange for specified flow targets. Thus, if 100 TAF behind Shasta was scheduled for delivery to Chipps Island, urban exporters might purchase and provide flows on high priority streams in exchange for the right to export the flows from the tributaries and hold the other water behind Shasta for later use.

The Environmental Water Account provides a great deal of flexibility in how environmental water is used. Contributions to the EWA might be used in place of strict operating requirements on each new water development project, especially for the difficult problem of defining incremental impacts. California's extremely variable weather patterns and fishery needs, coupled with CalFed's adoption of adaptive management make such flexibility attractive. However, use of the account requires a great deal of work to ensure that adequate water will be available, that the water will be usable for environmental needs and it makes it very difficult to develop ESA assurances.